Object Management Group
Framingham Corporate Center
492 Old Connecticut Path
Framingham, MA USA 01701-4568

Telephone: +1 508 820 4300
Facsimile: +1 508 820 4303

The CORBAmed Roadmap

CORBAmed: The OMG Healthcare Domain Task Force

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Revision History & Document Evolution Planning

Version	Release Date	Description
0.1	November 8, 1998	*Reviewed by Roadmap Working Group prior to Burlingame Technical Meeting.*
1.0	December 14, 1998	
1.0a	December 18, 1998	Updated CHST to version 3.0. Incorporate changes suggested by EricK Hagstrom
1.0b	DC Meeting, January 13, 1998	To be voted by CORBAmed plenary to be an official document

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1 Executive Summary

Health care providers across the world are finding that the issue of interoperability between heterogeneous information systems is adversely impacting their delivery of health care. Information systems that do not interoperate fail to provide information to address business needs. Inefficiencies in information management can effect organizations in many ways. Do you have any of these issues in your organization?

- Are you capturing encounter data at the point of service in an electronic form?
- Can electronic data captured in one clinical service by used by another?
- Can your information systems provide timely good quality information for clinical decision support?
- Can your information systems provide timely good quality information for managerial decision support?
- Can your clinical system interoperate with your financial systems?
- Do your computer systems allow for shared care between multiple caregivers within and across organizations?
- Can you communicate with external organizations, for example government agencies?
- Do you have adequate information to support appropriate disease or medical management?
- Are your maintenance and interfacing costs shrinking?
- Do you have flexibility, not locked in into current information systems and applications?

If the answer is NO to any of these, you have an interoperability problem!

Here are the Information Management/Information Technology "facts of life" you should be aware of:

- There will *not* be consensus on hardware platforms
- There will *not* be consensus on operating systems
- There will *not* be consensus on programming languages
- There will *not* be consensus on graphical user interfaces
- There will *not* be consensus on domain boundaries
- There will *not even* be consensus on data standards

Therefore, there MUST be consensus on a COMMON INTERFACE ARCHITECTURE.

A common interface architecture consensus is now emerging on a global scale. Solutions to interoperability challenges, are being defined and adopted by

International Standard Organizations. SOLUTIONS ARE BEING BUILT INTO INFORMATION SYSTEMS TODAY!

The Object Management Group (OMG) is an international standards organisation that develops technically excellent, commercially viable and vendor independent specifications for the software industry.

The OMG has reached international consensus on a common interface architecture, named the Common Object Request Broker Architecture (CORBA). Starting in the OMG, consensus has been achieved to accomplish a number of ISO (International Standards Organization) standards. In addition, OMG and CORBAmed has functional liaisons with various standards organizations, from ISO to the W3C, including healthcare specific groups such as DICOM, HL7, NCPDP and X12.

CORBAmed is the OMG's Domain Task Force on Healthcare with the mission to:

- Improve the quality of care and reduce costs by use of CORBA technologies for interoperability throughout the global healthcare community.
- CORBAmed defines standardized object-oriented interfaces between healthcare related services and functions.
- These interfaces serve to promote interoperability between a variety of platforms, operating systems, languages and applications.
- Utilize the OMG standardization process.

Thank you for your interest in CORBAmed the Object Management Group's Domain Task Force on Healthcare. We hope you will find relevant interoperability solutions for healthcare in the CORBAmed Roadmap and associated Toolkit CORBAmed 1.0. We look forward to your participation in CORBAmed. Allow the OMG to serve as your resource for healthcare interoperability standards. We hope that you will find the CORBAmed Roadmap and associated CORBAmed Toolkit (version 1.0) enjoyable and effective.

Included in the CORBAmed Roadmap is an introduction to CORBAmed and the business case highlighting the importance of distributed object computing in healthcare:

- **Requirements Elaboration** are activities which increase the Task Force's level of awareness for contemporary industry requirements. The OMG standardization process includes issuance of a Request for Information (RFI) and attendant response evaluations.
- **Specification Development** is the core of CORBAmed activity that results in standard specifications and adoption of object interfaces for healthcare domain components. The OMG standardization process includes issuance a Request for Proposal (RFP) and attendant response evaluations.

- **Healthcare Domain Architecture Development** is an activity that defines a framework to support and guide activities. A logical representation of a CORBAmed Healthcare System Template (CHST) provides the basis for this guidance. This logical representation is based on the ISO Reference Model for Open Distributed Processing (RM-ODP). The RM-ODP representation is then represented in UML based models to provide both a high level representation of CORBAmed services, the inter-dependencies and relationships between CORBA services.
- **OMG Support** provides policies and procedures for standardization activities. Ensuring consistency with, and support of, healthcare domain requirements with current OMG specifications provides viable solutions for healthcare and leverages solutions from other domains, such as Electronic Commerce, Finance, Telecommunications, Transportation and more.

A Toolkit of CORBAmed solutions (CORBAmed version 1.0) has been published for your convenience. The CORBAmed Toolkit includes the following items and much more to set you on the path to healthcare solutions:

- Standard Specifications
- Trial products and demonstrations
- White papers and presentations
- Available products
- Companies contributing to the task force

The success of CORBAmed truly relies on the priceless input from the healthcare industry. We strive to design compelling standard object services that meet your needs and the needs of your organization. It is our goal to provide you with the most value for your investment in CORBAmed.

Technology will not stand still while business systems catch up. An integration architecture must be adopted that enables continuous managed migration of technology, infrastructure and business services.

OMG and CORBAmed invite you to join them in their mission of bringing true interoperability to the healthcare industry. CORBAmed meets in conjunction with scheduled OMG Technical Committee meetings.

CORBAmed’s Mission and Goals are explained in more detail in Appendix E, and a brief description of OMG is given in Appendix F.

2 Introduction

2.1 CORBAmed Roadmap Charter

In April 1998, CORBAmed created it's Roadmap group and set out its intention to create a roadmap by adopting the following charter.

Final Version, agreed by CORBAmed - April 2, 1998

> "The major areas of Roadmap Working Group responsibility are to produce and maintain the CORBAmed Health Care System Template (CHST). It is a template of health care modules and their process interactions. The purpose of the template is to delineate and describe the interfaces and interactions between the various logical modules in health care systems. The interactions and interfaces between the modules will then serve as a reference against which the issuance of future health care related RFIs and RFPs can be considered.
>
> The CHST is the property of the CORBAmed DTF as a whole. It is the role of the Roadmap Working Group to procure and develop the CHST for validation and acceptance by the DTF, and to maintain it on behalf of CORBAmed. The group acts as the guardian of the CHST in assessing the impact of proposed RFIs and RFPs, both in CORBAmed and in other Task Forces, in achieving the goals of CORBAmed and in evolving the template itself.
>
> One of the missions of the Roadmap Working Group will be to facilitate liaison between CORBAmed and other groups in the OMG, where there are common interests. The RWG will make recommendations to DTF chairs on the need for and practical means of achieving technical interaction, including timetabling, communication and feedback."

2.2 Intended Audience

There exists a need to communicate the activities of the CORBAmed DTF to a variety of groups of individuals. These groups include OMG members who are not active participants within CORBAmed, new members to CORBAmed, and also existing members of CORBAmed. It is becoming more and more difficult to remain current on all activities as the group is growing at such a rapid pace. We therefore will create a working document to communicate past and current activities as well as to provide guidance for our future activities.

2.3 Purpose of the CORBAmed Roadmap

The purpose of the CORBAmed Roadmap is to allow for creating OMG deliverables, interoperability specifications within the Healthcare domain, while creating template of the services that CORBAmed offers or plans to offer. One of the goals of the roadmap is to enable immediate significant achievements to be achieved within CORBAmed by clearly defining the scope and boundaries of, and the relationships between the components in, one or more sub-sections of the vast domain of healthcare.

This document serves as a plan and schedule for the activities related to creating OMG specifications within healthcare. The roadmap includes the work currently initiated and expected to commence within the near future. The roadmap is a working document and will be updated upon the initiation of new CORBAmed activities. It identifies categories of activity and specific work items within those categories, lists expected work item deliverables; and provides a schedule for work items. Hence, this document will serve the purpose of guiding as well as describing the CORBAmed activities.

Much of what is contained in this document exists in the minds of those who participate in CORBAmed DTF activities. The purpose of this inclusion is to provide communication to those expressing an interest. This can be seen in the following sections: requirements elaboration and specification development.

2.4 Liason Activity

CORBAmed has formed both informal and formal relationships with the following other standards groups.

- Health Level 7 (HL7)
- DICOM
- Stichting Groupe RICHE
- W3C
- The Open Group
- ISO TC215
- ISO/IEC JTC1
- ASTM
- NEMA
- IEEE1073
- X12
- NCPDP,
- CEN TC251

2.5 Domain Architecture

The debate of the role and existence of domain architecture(s) within the OMG has been widely discussed. There are a great deal of OMG and ISO activity in exploring an appropriate methodology and model for describing such architectures. It may be that CORBAmed as a vertical domain within the OMG will be given some directives on how to describe its architecture. There are also many excellent efforts within the healthcare field and other related efforts within the OMG, including its vertical domains, will directly drive the input for such domain architecture, as the role of CORBAmed is to create open standardized CORBA interfaces. The initiative of producing specifications will ultimately be driven by the CORBAmed CHST.

The enterprise view of the Reference Model – Open Distributed Processing (RM-ODP) is being discussed and presented as a likely and appropriate candidate methodology to describe a domain architecture.

3 Business Case

3.1 The State of Healthcare Informatics

The use of automation in healthcare began in the late 1960's with the advent of Hospital Information Systems (HIS). The original HIS' were mainframe based information systems and supported billing. Other administrative functions (admission-discharge-transfer of patients, inventory, scheduling) were added with time. The availability of lower cost minicomputers in the 1970's spurred the introduction of departmental information systems (radiology information system, lab information system, pharmacy management system, etc.). These systems supported similar administrative and workflow tracking functions at the clinical departmental level. The mainframe-based HIS systems tried to respond by adding departmental modules, but the special clinical requirements of individual departments hindered this (at least until the early 1990s when acquisitions resulted in a few companies with domain expertise across the hospital's departments. However, ambulatory care remains an informatics specialty largely unto itself to this day). The result has been a "tower of babel" situation where most information systems within a hospital or IDS (Integrated Delivery System) cannot interoperate. There are existing standards that allow these systems to *communicate*, but the indusrty is yet to achieve healthcare systems interoperability.

The 1980's saw the rise of relational database management systems and client server computing. Many businesses made major investments in converting to these technologies. However, healthcare has been slow to respond. The reasons for this can only be speculated upon, but it has been noted that healthcare institutions typically spend a far lower percentage of their operating budgets on informatics than do other industries, such as banking, communications and transportation. This is thought by many to be due to a lack of incentive under fee for service medicine to invest in money saving informatics. In addition, there has been a strongly held belief on the part of clinicians that healthcare delivery is not a "business" and cannot be managed as such (note: managed care directly challenges this assumption which is one likely reason why it is so controversial). In any event, the healthcare informatics business is just now in the process of converting from mainframe/minicomputer – terminal technology to client-server. Industry groups such as Microsoft's Healthcare Users Group (HUG) have grown in response to this trend.

While informatics has long supported the financial and administrative sides of healthcare, it is only recently that it has looked toward supporting the clinician. Electronic patient monitoring and imaging equipment has been around since the

1960's, but until the 1990's each such piece of equipment was an island unto itself. Physicians typically never touched these machines; specially trained technologists operated them and produced hardcopy for the physician to diagnose from. The medical imaging business responded to a call for interoperability in the mid-1980's with the ACR-NEMA standard, but it took over ten years for this to evolve to the present DICOM standard. DICOM supports interfacing various pieces of imaging equipment, but interoperability remains an elusive goal. Clinical monitoring equipment has likewise achieved cross-vendor connectivity (i.e. with the Medical Information Bus – MIB – standard), but not true interoperability.

As we move toward the year 2000, we find that healthcare institutions (the IDS', in particular) have developed a strong need for affordable, interoperable information systems. These systems must operate seamlessly across a wide variety of institutions – pharmacies, laboratories, physician practices of all sizes, outpatient clinics, community hospitals, and tertiary/quaternary care regional medical centers. Furthermore, the MCO model means that participating institutions need to interoperate by sharing their information; but as individual business entities, each institution in an IDS must maintain ownership of their important patient-centered records. Centralized systems cannot meet these needs. Neither can client-server systems (which, themselves, are centralized data storage systems with local data analysis and presentation capabilities). *However, distributed object technology would seem ideal for this purpose.* The object oriented (OO) principle of encapsulation is ideal for the protection of data ownership while allowing controlled access to the information by external clients. Distributed object technology (such as CORBA) allows healthcare related objects to communicate over a network; in particular, across physical computer boundaries. CORBA, specifically, as a platform and language independent standard for distributed object technology, seems to offer the best migration path from the current tower of babel to interoperable IDS's.

3.2 The Distributed Object World in Healthcare

The last section presented a brief history of healthcare informatics and stated a case for distributed object technology in healthcare in terms of encapsulation and platform independence. Section 2 demonstrated that the trend toward managed care is forcing healthcare to look at itself as a business, and to behave as such. If this trend continues (and there is no reason to believe that it will not), then the other important OO attributes of inheritance and polymorphism should support a major paradigm shift in healthcare informatics; that is, the trend way from "vertically oriented" departmental systems toward "horizontally oriented" business objects. This concept is depicted in the figure below.

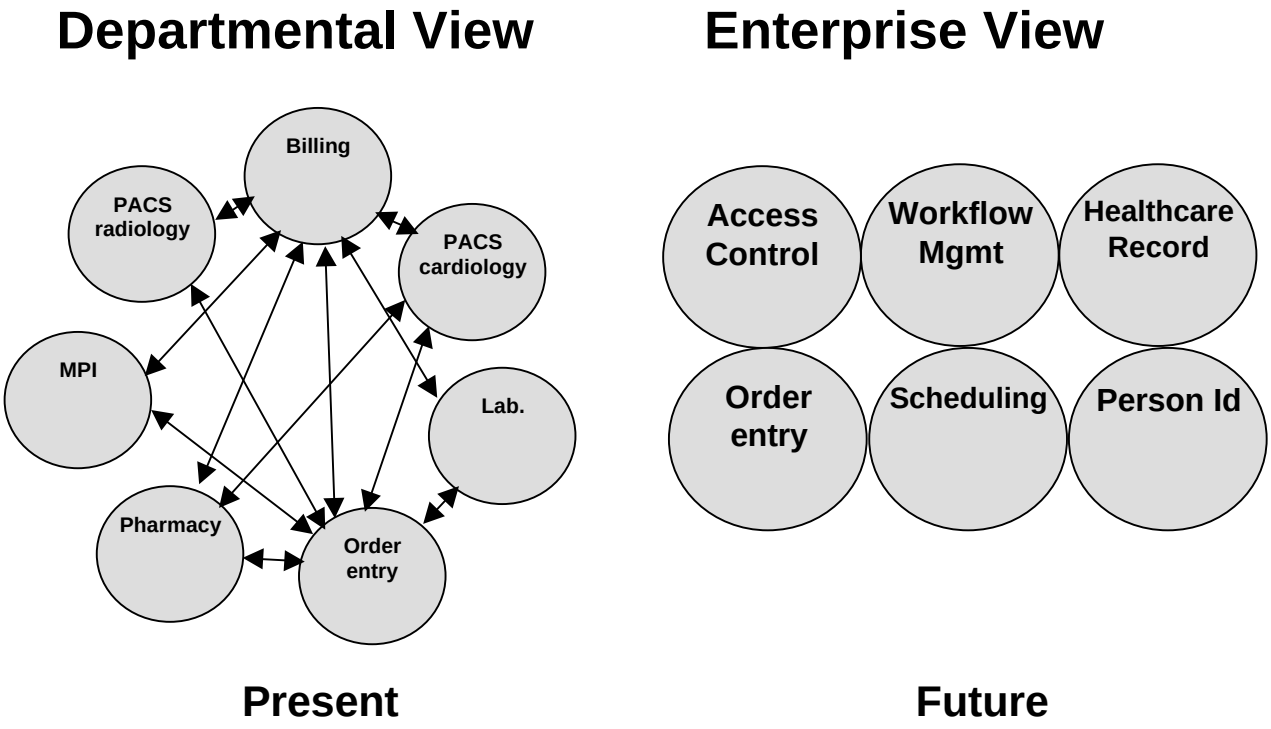


Figure – The changing paradigm of Health Informatics

Instead of viewing the IDS as radiology, cardiology, laboratory, etc., the object oriented view is of common services, e.g.: order entry, enterprise scheduling, results reporting, etc. These services have many operations (methods) in common across the clinical departments. If they are created on an enterprise basis, they can be subclassed to meet any detailed needs or nuances of specific clinical departments. The feeling here is that a lot of duplicated functionality (in operations, staffing and software) could be eliminated with this approach.

The cost and quality of healthcare software can be improved by inheriting characteristics which are common to other businesses. Most businesses involve persons and/or institutions which interact in the following ways:

- Ordering
- Tracking (workflow)
- Scheduling
- Delivery of goods/services (order fulfillment)
- Billing
- Inventory
- Personnel administration
- Common services (security, timekeeping, persistence, vocabulary, etc.)

It should therefore be possible to build a top level model of the healthcare domain which inherits from these general business functions:

- Persons:
  - Patients
    - *PIDS service*
  - Guardians/guaranteer
  - Physicians
  - Nurses
  - Technologists
  - Therapists
  - Pharmacists
  - Clerical Personnel
  - Administrative personnel
  - Maintenance personnel
  - Etc.
- Institutions:
  - Hospital
  - Clinic
  - Office practice
  - Laboratory
  - Pharmacy
  - Etc.
- Ordering
  - Clinical Orders (medications, diagnostic procedures, therapeutic procedures)
    - *Pharmacy*
  - Event orders (ADT)
- Tracking
  - Enterprise (patient tracking)
  - Departmental (workflow tracking)
    - *CORBA workflow*
- Scheduling
  - Enterprise
  - Departmental
- Delivery of goods/services (order fulfillment)
  - *Clinical Observations*/Results Reporting
    - *CORBAlex (vocabulary service)*
  - *Clinical Decision Support*
- Etc.
  - *Healthcare Financial Services*

The italicized items in the above “inheritance model” indicate where current CORBAmed activities can fit.

It is important to note that the transition from a legacy department- based information environment to an enterprise-wide distributed object environment cannot realistically take place in one shot. There are far too many legacy systems which support essential functions within the healthcare delivery system today. Therefore, CORBAmed should adopt a solution which allows CORBA specifications to support implementations that bridge between message-based legacy systems and interoperable CORBA components.

4 Adopted Specifications and Specification Development (RFPs)

4.1 Introduction

The purpose of this focus activity is to foster the adoption of standard object interfaces for healthcare domain components. These standard object interfaces will be developed through the group's adherence to OMG convention. That is, the issuance of Requests for Proposal (RFP), the evaluation of proposed solutions to the RFP, and the evolution of a related specification.

This focus activity embraces the primary purpose for the group's existence.

4.2 Specific Work Items

Work items identified within this focus activity include:

- Issue RFPs
- Evaluate responses to RFPs
- Make recommendations for adoption - specification development
- Follow-up with RFPs that subsume integration frameworks and address domains
- Evaluation of RFCs

4.3 Deliverables

Anticipated deliverables produced by this focus activity include:

- RFPs
- RFP responses
- Recommendations to DTC

4.4 Adopted Specifications

4.4.1 Patient Identification Services (PIDS)

Summary

Through out an individual's lifetime they may have episodes of care provided by hundreds of healthcare providing organizations (e.g. hospitals, medical centers, Dr. offices, etc.). These organizations maintain medical records for the patients they have cared for. When a patient comes into a healthcare organization for care there is a need to find the records for any previous care that patient had with the institution. Each healthcare provider may have used a different scheme (e.g. numbering system) to identify the patient. The system used for identifying a patient is called a Master Patient Index (MPI).

In addition it is desirable to combine the medical records from multiple institutions in order to show a complete picture of a person's health record. This need to combine records from different organizations has increased dramatically in the last few years due to consolidations and collaborations between providers.

Because of the rapid change in the healthcare environment within the last few years the systems and standards needed to satisfy this need to share patient records do not yet exist. One of the major impediments to this sharing of patient records between organizations is a lack in the ability to identify a patient in a consistent manner. Due to this inability there is no standard way today to combine a patient's records from multiple institutions.

This RFP solicits proposals for specifications for the common features of a patient identification system that allows multiple of these patient identification systems to interoperate.

The complete Patient Identification Services (PIDS) RFP can be found on the OMG web server as document:

http://www.omg.org/pub/docs/corbamed/96-11-02.rtf :

The initial and revised responses to the Patient Identification Services (PIDS) RFP were as follows:

- Health Data Sciences Corporation

  http://www.omg.org/pub/docs/corbamed/97-05-06.rtf
- 2AB, BlackWatch Technologies, Care Data Systems, Inc., CareFlow|Net, Inc., HBO & Company, HealthMagic, Inc., IONA Technologies PLC, IBM, Protocol Systems, Inc., Oacis Healthcare Systems

  http://www.omg.org/pub/docs/corbamed/97-05-03.rtf

http://www.omg.org/pub/docs/corbamed/97-06-01.rtf: revision 2
http://www.omg.org/pub/docs/corbamed/97-07-03.rtf: revision 3
http://www.omg.org/pub/docs/corbamed/97-10-03.rtf: revision 4
http://www.omg.org/pub/docs/corbamed/97-11-01.rtf: revision 5

The final and ratified PIDS submission:

- 2AB, Care Data Systems, Inc., CareFlow|Net, Inc., HBO & Company, HealthMagic, Inc., HUBlink, Inc., IBM, IDX Systems Corporation, IONA Technologies PLC, Oacis Healthcare Systems, Protocol Systems, Inc., Sholink Corporation:

  http://www.omg.org/pub/docs/corbamed/98-02-29.rtf

Some minor corrections to the PIDS specification have also been made as an RTF and are being voted on:

http://www.omg.org/pub/docs/corbamed/98-10-03.rtf

4.4.2 Lexicon Query Services (LQS)

Summary

This RFP solicited proposals for specifications of IDL interfaces for the common features of a set of lexicon query services. This RFP describes the requirement for services to support lexicons (controlled terminology resources) in a distributed object system conforming to the OMA. Despite many efforts over the years, the ability to consistently and precisely represent information, such as observational and historical data in healthcare, has eluded the industry. This ability to represent a concept in an unambiguous machine-readable format is key to the better management of clinical processes within a healthcare organization, and between a healthcare organization and its various trading partners. The ability to support a discrete coded lexicon is of critical importance within the healthcare business segment. It is the first step towards being able to:

- Better manage the communication of information between disparate organizations
- Support the collection and analysis of clinical processes and outcomes as a result of consistent and clinically specific encoding
- Enable the use of sophisticated rule-based ‘decision support’ tools, which require consistent data representation to be effective. For example, the rule:

  If the order is for any drug in the category antibiotics and there is a history of allergy to any antibiotic, send an alert regarding possible cross-allergic reactions ***r****equires the ability to classify all antibiotics under a single ‘parent’ in a specified hierarchy to assure that no matter what drug is ordered, if it is in the category antibiotics, this rule is triggered.*

- Assist in the reporting of information to various interested parties in a consistent manner

It is important to make the distinction between the lexicon content (i.e., the "vocabularies" themselves), and the methods to support lexicon queries and functions. In fact, we should not assume that the lexicon query services defined through this effort are necessarily limited to support of a health lexicon/domain of content. It may be the case that these services are a requirement across other domains/task forces within OMG. It is anticipated that responses could be received from vendors who provide similar services outside of the healthcare arena. However, since the primary interest and critical, near term need resides within the healthcare domain, CORBAmed has taken the lead the effort to define these services.

The complete Lexicon Query Services RFP can be found on the OMG web server as document:

http://www.omg.org/pub/docs/corbamed/97-01-04.rtf

Initial and revised responses to the LQS were as follows:

- 3M 3M Health Information Systems, Protocol Systems, Inc., International Business Machines:

  http://www.omg.org/pub/docs/corbamed/97-09-02.rtf :

The final and ratified LQS submission:

- 3M Health Information Systems, Protocol Systems, Inc.:

  http://www.omg.org/pub/docs/corbamed/98-03-22.pdf

4.5 Current Work Items

The principal work items in this focus activity are related to the issuance of RFPs and evaluation of RFP responses.

4.5.1 Clinical Observations Access Service (COAS) RFP

Summary

This RFP solicits proposals for accessing clinical observations. Clinical observations constitute a significant proportion of the information recorded about any patient. Examples of clinical observations include the following: laboratory results; vital signs; subjective and objective observations and assessments;

observations and measurements provided by a specialist such as radiologist or pathologist who interprets images and other multi-media data. Interoperable specifications that support the activities involved in accessing clinical observations are sought in this RFP. The specifications should leverage existing standards such as HL7 and DICOM .

The complete Clinical Observations Access Service (can be found on the OMG web server as document:

http://www.omg.org/pub/docs/corbamed/97-12-28.rtf

Responses to the COAS RFP are as follows:

- 3M, Care Data Systems, CareFlow|net, HBO & Company, Philips Medical Systems, Protocol Systems:

  http://www.omg.org/pub/docs/corbamed/98-08-02.rtf

Healthcare Resource Access Control (HRAC) RFP

Summary

The complexity of the healthcare security problem domain requires exercising more sophisticated access control policies rather than the general ones used in the CORBA Security service. This complexity leads system developers to proprietary solutions on top of security provided by ORB systems. At the same time, commonality of business domain tasks and security requirements across healthcare computing environments promotes and requires exercising fine-grained access control policies in a uniform and standard way. It is expected that a number of RFPs will need to be issued to fully address the security concerns and requirements of healthcare industry, including ones related to access control, auditing, nonrepudiation, and notification of security breaches, and other related themes.

This RFP solicits proposals for resource access control facilities based on the CORBA Security service. Such a facility will provide a uniform way for application systems to enforce resource-oriented access control policies in the healthcare domain.

The complete Healthcare Resource Access Control (HRAC) can be found on the OMG web server as document:

http://www.omg.org/pub/docs/corbamed/98-02-16.rtf:

The initial responses to the HRAC RFP are as follows:

- 2AB, Baptist Health Systems of South Florida, Careflow|net, IBM:
  http://www.omg.org/pub/docs/corbamed/98-10-02.rtf

4.5.2 Healthcare Data Interpretation Facility (HDIF) RFP

Summary

This RFP solicits proposals for a Healthcare Data Interpretation Facility (HDIF) that will provide a general-purpose infrastructure capable of the following:

- accommodate a variety of intelligent transforms for clinical data;
- enable easy integration of so called intelligent systems into existing healthcare information systems;
- provide common interfaces for performing intelligent transforms on healthcare data distributed across disparate healthcare data domains.

The complete Healthcare Data Interpretation Facility (HDIF) RFP can be found on the OMG web server as document:

http://www.omg.org/pub/docs/corbamed/98-03-30.rtf

Initial responses to RFP 6 are as follows:

- Chiron Diagnostics
  http://www.omg.org/pub/docs/corbamed/98-12-05.pdf
- Cognitech
  http://www.omg.org/pub/docs/corbamed/98-12-07.pdf
- Concept5, Hitachi
  http://www.omg.org/pub/docs/corbamed/98-12-06.pdf
- Theragraphics, Los Alamos Natl. Laboratory
  http://www.omg.org/pub/docs/corbamed/98-12-08.pdf

4.5.3 Clinical Image Access Service (CIAS) RFP

Summary

This RFP solicits proposals for accessing (i.e. retrieving) clinical images and related information. Clinical images are a subset of clinical observations and the Clinical Image Access Service (CIAS) must therefore be compatible with the CORBAmed Clinical Observations Access Service (COAS). CIAS will provide more detailed, image-related

access services to COAS. The CIAS will provide image scaling and windowing to meet the needs of general clinicians for the non-diagnostic viewing of medical images. CIAS is intended to be a retrieve-only service. Furthermore, CIAS will deal only with clinical images; requirements for document images (bit maps) are not included in this solicitation.

The most prominent standard for image interchange in medicine is the Digital Imaging and COmmunications in Medicine (DICOM) standard of the National Electrical Manufacturers Association (NEMA). The CIAS will provide a simplified view of the DICOM information model, which supplies images and limited meta-data to users in formats which are compatible with better known image standards and with office type computing equipment and networks. The CIAS will hide the complexities of DICOM while providing the basic services needed to support computer-based patient records over low and moderate speed networks.

The complete Clinical Image Access Service (CIAS) RFP, CORBAmed RFP 7, can be found on the OMG web server as document:

http://www.omg.org/docs/corbamed/98-06-17.rtf

The initial responses to this RFP are as follows:

- There are no responses to this RFP yet.

4.5.4 Medical Transcription Management (MTM) RFP

Summary

The management of documents throughout an organization requires tight integration and strong communication among multiple entities. Historically, manual interfaces, proprietary interfaces, and HL7 (Health Level 7) messaging have met these needs. However, these solutions have only been partial, and are proving inadequate in today's complex healthcare environments. Standardized object interfaces promise to provide a solution which not only preserves the current modes of document management, but also provides a solid, long-term technical framework to build the next generation of healthcare information systems.

This RFP solicits proposals for document management facilities compatible with the COAS (CORBAmed Clinical Observation Access Service). Such facilities will provide mechanisms to access medical documents and related meta-data in a manner that supports the workflow pertaining to capturing, managing, documenting, routing, authenticating (signing), notifying, and verifying.

The complete Medical Transcript Management (MTM) RFP can be found on the OMG web server as document:

http://www.omg.org/pub/docs/corbamed/98-11-02.rtf

The initial responses to this RFP are as follows:

- There are not responses to this RFP yet

4.5.5 Pharmacy Interaction Facility (PIF) RFP

Summary
This RFP solicits proposals for the interface specifications of a Pharmacy Interaction Facility (PIF) that will facilitate the communication of prescription information between pharmacy prescribers and pharmacy dispensers using established healthcare data content as reflected in a variety of publicly-available national and international standards.

Current trends in public policy involved with government mandated standards for electronic healthcare interactions will influence the requirements for interoperability in healthcare. We will likely see multiple technologies coexisting and interoperating in the future. In particular, future pharmacy interaction systems, based on standards with object-oriented specifications, will likely need to interoperate in some way with systems based on today's character string standards. In addition, pharmacies and physicians will require interoperability to allow communications across many disparate computing platforms.

The complete CORBAmed RFP 3 can be found on the OMG web server as document:
http://www.omg.org/pub/docs/corbamed/97-12-22.rtf : Pharmacy Interaction Facility (PIF) RFP

- This RFP is no longer active

4.6 Criteria for Selection

Specification development will proceed in an order that CORBAmed identifies as meeting critical industry needs and essential to completing the group's architectural model.

5 Requirements Elaboration (Requests for Information - RFIs)

5.1 Introduction

The purpose of this focus activity is to acquire more detailed requirements. This effort is vital to the group's comprehension of industry needs and is crucial in aligning OMG specification development with healthcare requirements. The request for discovering requirements in a particular area is primarily based on an interest and participation by an OMG member.

5.2 Specific Work Items

Work items of a general nature identified within this focus activity include:

- Issue RFIs on requirements / solicit vendors
- Survey available, existing healthcare architectures (via RFIs) for purpose of identifying candidates for standardization, positioning the group to ask rather than define healthcare frameworks
- Issue white papers addressing healthcare topics

5.3 Deliverables

Anticipated deliverables produced by this focus activity include:

- White papers
- RFIs
- RFI responses
- Updated CHST
- Scope definitions for RFPs

5.4 Past Work Items

5.4.1 The CORBAmed RFI

Summary

CORBAmed RFI 1 was issued to solicit information about requirements, projects, and products that would provide guidance for healthcare related object system interoperability. The Object Management Group (OMG) CORBAmed Domain Task Force will use this information to begin the technology adoption process for OMG-compliant interfaces for systems used in healthcare delivery. This RFI seeks information to help CORBAmed make useful and efficient decisions in the healthcare technology adoption process.

CORBAmed RFI 1 can be found on the OMG web server as document #:

http://www.omg.org/pub/docs/corbamed/96-01-01.rtf : CORBAmed RFI

Responses to CORBAmed RFI 1 are as follows:

- http://www.omg.org/pub/docs/corbamed/96-04-01.rtf : IBM Health Solution Unit RFI response
- http://www.omg.org/pub/docs/corbamed/96-05-01.rtf : HL7 IMSIG Response to CORBAmed RFI
- http://www.omg.org/pub/docs/corbamed/96-05-02.rtf : HealthMagic CORBAmed RFI response
- http://www.omg.org/pub/docs/corbamed/96-05-03.rtf : University of Magdeburg RFI response
- http://www.omg.org/pub/docs/corbamed/96-05-04.rtf : RFI response from SHINE
- http://www.omg.org/pub/docs/corbamed/96-05-05.rtf : RFI response from RICHE
- http://www.omg.org/pub/docs/corbamed/96-05-06.rtf : Protocol Systems RFI response
- http://www.omg.org/pub/docs/corbamed/96-05-07.rtf : CORBAmed RFI response from Andersen Consulting
- http://www.omg.org/pub/docs/corbamed/96-05-08.rtf : University of Wales, Aberystwyth RFI response
- http://www.omg.org/pub/docs/corbamed/96-05-09.rtf : Benchmarking Partners RFI response
- http://www.omg.org/pub/docs/corbamed/96-05-10.rtf : Hewlett-Packard RFI response
- http://www.omg.org/pub/docs/corbamed/96-05-11.rtf : Health Data Sciences Corp. RFI response

- http://www.omg.org/pub/docs/corbamed/96-05-12.rtf : Los Alamos National Laboratory RFI response
- http://www.omg.org/pub/docs/corbamed/96-05-13.rtf : NHS RFI response
- http://www.omg.org/pub/docs/corbamed/96-05-14.rtf : Koop Foundation RFI response
- http://www.omg.org/pub/docs/corbamed/96-05-15.rtf : Kurzweil AI RFI response

5.4.2 Clinical Observations RFI

Summary

CORBAmed RFI 2 was issued to solicit information about requirements that would provide guidance to the CORBAmed Domain Task Force (DTF) of the Object Management Group (OMG) in developing specifications for healthcare information systems dealing with patient observation data. The overall goal will be to adopt vendor-neutral common interfaces that may improve the quality of care and reduce costs by utilizing CORBA technologies for interoperability between systems, applications, and instruments that detect, transmit, store, and display medical information dealing with observations of a particular patient's medical condition. CORBAmed DTF will utilize the OMG's open technology adoption process to standardize interfaces for these healthcare objects.

CORBAmed RFI 2 can be found on the OMG web server as document #:

http://www.omg.org/pub/docs/corbamed/97-05-02.rtf : Clinical Observations RFI
Responses to RFI 2 are as follows:

- http://www.omg.org/pub/docs/corbamed/97-08-04.rtf : Protocol Systems Response to CORBAmed RFI2
- http://www.omg.org/pub/docs/corbamed/97-08-05.rtf : Joint Response to CORBAmed RFI2 (MIG/CHIME)
- http://www.omg.org/pub/docs/corbamed/97-08-06.rtf : The Gehr Architecture-Supporting document to the MIG/CHIME Response to CORBAmed RFI2 (Part 1)
- http://www.omg.org/pub/docs/corbamed/97-08-07.rtf : The Gehr Architecture-Supporting document to the MIG/CHIME Response to CORBAmed RFI2 (Part 2)
- http://www.omg.org/pub/docs/corbamed/97-08-08.rtf : Yale University Response to CORBAmed RFI2
- http://www.omg.org/pub/docs/corbamed/97-08-09.rtf : Addendum to the Protocol System Response to CORBAmed RFI2
- http://www.omg.org/pub/docs/corbamed/97-09-04.rtf : HL7 SGML/XML Response to CORBAmed RFI2

- http://www.omg.org/pub/docs/corbamed/97-09-05.rtf : Joint Response to CORBAmed RFI2 (Baptist, CareFlow, Kurzweil, & Philips)
- http://www.omg.org/pub/docs/corbamed/97-09-06.rtf : American Association For Medical Transcription Response to CORBAmed RFI2
- http://www.omg.org/pub/docs/corbamed/97-09-07.rtf : DICOM Working Group 8 Response to CORBAmed RFI2 (Clinical Observations)
- http://www.omg.org/pub/docs/corbamed/97-09-08.rtf : HL7 IMSIG Response to CORBAmed RFI2 (Clinical Observations RFI)

http://www.omg.org/pub/docs/corbamed/97-09-10.rtf : Addendum to the University of Michigan/Protocol Systems Response to CORBAmed RFI2

5.4.3 Clinical Decision Support RFI

Summary

This Request for Information (RFI) solicits information about requirements that will provide guidance to the CORBAmed Domain Task Force (DTF) of the Object Management Group (OMG) in developing specifications for clinical Decision Support Systems (DSS). The overall goal will be to adopt vendor-neutral common interfaces that may improve the quality of care and reduce costs by utilizing CORBA technologies for interoperability between systems, applications, and instruments that detect, transmit, store, and display medical information used in clinical DSS. The CORBAmed DTF will utilize the OMG's open technology adoption process to standardize interfaces for these healthcare objects.

The complete CORBAmed RFI 3 can be found on the OMG web server as http://www.omg.org/pub/docs/corbamed/97-06-05.rtf : Clinical Decision Support RFI (CORBAmed RFI3)

Responses to RFI 3 are as follows:

- http://www.omg.org/pub/docs/corbamed/97-08-02.rtf : University of Utah/CogniTech response to the CORBAmed RFI3 (Clinical Decision Support RFI)
- http://www.omg.org/pub/docs/corbamed/97-08-03.rtf : ASTM Response to CORBAmed RFI3 (Clinical Decision Support RFI)
- http://www.omg.org/pub/docs/corbamed/97-09-03.rtf : Federal University of Sao Paulo Response to CORBAmed RFI3 Clinical Decision Support RFI)
- http://www.omg.org/pub/docs/corbamed/97-09-09.rtf : Chiron Diagnostics to CORBAmed RFI3 (Clinical Decision Support RFI)

5.4.4 CORBA and HL7 - Approaches and Considerations RFI

Summary

This Request for Information (RFI) solicits information about requirements that will provide guidance to the CORBAmed Domain Task Force (DTF) of the Object Management Group (OMG) in the area of CORBA based HL7 implementation approaches. The overall goal of CORBAmed is to adopt vendor-neutral common interfaces that may improve the quality of care and reduce costs. CORBAmed DTF will utilize the OMG's open technology adoption process to standardize interfaces in the healthcare arena.

In the area of HL7 as a standard messaging approach, CORBAmed has established a liaison relationship with the HL7 standards group. One of the primary reasons for this liaison is the desire on the part of CORBAmed to not 'recreate the wheel'. CORBAmed desires to leverage the HL7 reference information model, other HL7 based initiatives, and other standards that help support healthcare communications. As part of that relationship, CORBAmed is attempting to assist HL7 by providing technical analyses regarding implementation approaches, and how to best take advantage of the capabilities inherent in the CORBA distributed object technology framework. We believe that there are a number of possible technical approaches that can be utilized, but are uncertain as to the most optimal approach. Several approaches have been defined already within HL7, through the SIGOBT. There are, we believe, a number of other organizations who have begun to implement CORBA based solutions, who are also using HL7 messages as the semantic backdrop to their implementations.

The complete CORBAmed RFI 4a can be found on the OMG web server as document:
http://www.omg.org/pub/docs/corbamed/97-09-15.rtf : HL7 RFI

Responses to RFI 4a are as follows:

- http://www.omg.org/pub/docs/corbamed/98-01-04.rtf : HBO & Company Response to the HL7 RFI
- http://www.omg.org/pub/docs/corbamed/98-01-05.rtf : Hewlett-Packard Response to the HL7 RFI

5.4.5 Lifesciences RFI

Summary

This Request for Information (RFI) solicits information about requirements, projects, and products that will provide guidance for life sciences research

related object system interoperability. The Object Management Group (OMG) and, specifically, the Life Sciences Research Domain Special Interest Group (LSR-DSIG), will use this information to begin the technology adoption process for OMG-compliant interfaces for systems used in life sciences research. The mission of the Life Sciences Research DSIG is:

- To improve the quality and utility of software and information systems used in Life Sciences Research through use of the Common Object Request Broker Architecture (CORBA) and the Object Management Architecture (OMA).
- To encourage the development of interoperable software tools and services in Life Sciences Research.
- To prepare to use the Object Management Group (OMG) technology adoption process to standardize interfaces for software tools, services, frameworks, and components in Life Sciences Research.
- To communicate the requirements of the Life Sciences Research domain to the Platform Technical Committee.
- To coordinate with OMG Task Forces and Special Interest Groups, and other standards organizations and information providers to ensure common standards.

The OMG encourages users, consultants, systems integrators, and developers of life sciences research related devices, instruments, applications, databases, and systems to become involved with this process by responding to this RFI. OMG members and non-members may submit responses. Current compliance with OMG specifications is not a prerequisite for response to this RFI. The RFI response can consist of pre-existing product documentation, but should preferably be organized and presented in accordance with this RFI.

NOTE: According to OMG rules, SIGs may not issue RFIs. Therefore, this RFI is being issued by the CORBAmed Task Force on behalf of the Life Sciences Research DSIG. Responses to this RFI will be reviewed by LSR-DSIG.

The complete CORBAmed RFI 4b can be found on the OMG web server as document:
http://www.omg.org/pub/docs/corbamed/97-09-16.rtf : Life Science Research RFI (CORBAmed RFI4)

Responses to RFI 4b are as follows:

- http://www.omg.org/pub/docs/corbamed/97-11-07.rtf : Birkbeck College, Dept. of Crystallography Response to the Lifescience RFI
- http://www.omg.org/pub/docs/corbamed/97-11-08.rtf : Genome Database Reponse to the Lifescience RFI (Part 1)
- http://www.omg.org/pub/docs/corbamed/97-11-09.rtf : Genome Database response to the Lifescience RFI (Part 2)

- http://www.omg.org/pub/docs/corbamed/97-11-10.rtf : Oxford Molecular Group Response to the Lifescience RFI
- http://www.omg.org/pub/docs/corbamed/97-11-11.rtf : Roslin Institute Response to the Lifescience RFI
- http://www.omg.org/pub/docs/corbamed/97-11-12.rtf : University of Manchester Response to the Lifescience RFI
- http://www.omg.org/pub/docs/corbamed/97-11-13.rtf : University College London response to the Lifescience RFI
- http://www.omg.org/pub/docs/corbamed/97-11-14.rtf : National Center for Genome Resources Response to the Lifescience RFI
- http://www.omg.org/pub/docs/corbamed/97-11-15.rtf : Sequana Therapeutics Response to the Lifescience RFI
- http://www.omg.org/pub/docs/corbamed/97-11-16.rtf : Bioperl Developers response to the Lifescience RFI
- http://www.omg.org/pub/docs/corbamed/97-11-17.rtf : Tripos Response to the Lifescience RFI
- http://www.omg.org/pub/docs/corbamed/97-11-18.rtf : NetGenics Response to the Lifescience RFI
- http://www.omg.org/pub/docs/corbamed/97-11-19.rtf : EBI Response to the Lifescience RFI
- http://www.omg.org/pub/docs/corbamed/97-11-20.rtf : Berkeley Drosophila Genome Center Response to the Lifescience RFI
- http://www.omg.org/pub/docs/corbamed/97-11-21.rtf : G.I.S Infobiogen Response to the Lifescience RFI
- http://www.omg.org/pub/docs/corbamed/97-11-22.rtf : University of Pennsylvania Response to the Lifescience RFI

5.5 Current Work Items

5.5.1 CORBA/M Interoperability RFI

Summary

This Request for Information (RFI) solicits information to guide the CORBAmed Domain Task Force (DTF) of the Object Management Group (OMG) in developing specifications that will facilitate the integration of information systems written in the American National Standards Institute (ANSI) M programming environment with the Common Object Request Broker Architecture (CORBA). The overall goal will be to adopt vendor-neutral specifications that will preserve and enhance ANSI M systems by leveraging CORBA distributed-object technologies. The CORBAmed DTF will utilize the OMG's open technology adoption process in pursuit of this goal.

CORBAmed will use responses to this RFI to determine the interest and requirements of the information systems community for interoperability standards

between M and CORBA technologies. If appropriate, one or more Requests For Proposal (RFPs) may be issued to solicit CORBA/M interoperability specifications.

Alternatively known as MUMPS (Massachusetts General Hospital Utility Multi-Programming System), the M programming environment consists of an interpreted, multi-user, multi-tasking, general-purpose programming language with integrated hierarchical persistent storage. M is the predominant language worldwide with which large integrated hospital information systems have been developed. In addition to numerous commercial healthcare systems, the hospital information systems for the United States Department of Defense (DoD), Department of Veterans Affairs (VA), and Indian Health Services (IHS) have all been written in M. M has also found success as a language for implementing systems in financial, travel, shipping, and other industries.

This RFI is being issued in order to gather information from the M and CORBA communities with respect to the business case, technical need, and prospective solutions for integrating their respective technologies.

The complete CORBA/M Interoperability RFI (CORBAmed RFI5) can be found on the OMG web server as document:

http://www.omg.org/pub/docs/corbamed/98-02-04.rtf :

Responses to RFI 5 are as follows:

- None received at this time

5.5.2 Healthcare, Administrative, Logistical and Financial Encounter Management RFI (HALFEM)

Summary

This Request for Information (RFI) solicits information about requirements in the area of the Administrative Encounter that will provide guidance to CORBAmed, the Healthcare Domain Task Force (DTF), within the Object Management Group (OMG). The overall goal of CORBAmed is to adopt vendor-neutral common interfaces that may improve the quality of care and reduce costs. CORBAmed DTF will utilize the OMG's open technology adoption process to standardize interfaces in the healthcare arena.

HALFEM information can be used to streamline registration, admission and billing processes. Today this information sits in many places in various degrees of completion and accuracy.

The responses may describe the data being captured during the information collection process, in particular to streamline the process.

HALFEM information may include things like the following:

- Demographic information
- Mechanism for managing identifiers for clinical encounters
- Next of kin
- Advanced directives
- Provider information (primary, attending, consulting)
- VIP status
- Insurance/Guarantor Information
- Waiting list
- Eligibility
- Enrolment
- Scheduling

The complete Healthcare, Administrative, Logistical and Financial Encounter Management RFI (CORBAmed RFI7) can be found on the OMG web server as document:

http://www.omg.org/pub/docs/corbamed/98-07-02.rtf :

Responses to RFI 7 are as follows:

- None received at this time

6 CORBAmed Healthcare System Template

6.1 Introduction

The purpose of this focus activity is to define a reference template for healthcare domain software components. This activity supports the requirements elaboration focus activity and will provide a framework for continuous specification development activity. This template is not static, it will change and develop with the work of the CORBAmed DTF.

6.2 Specific Work Items

There is only one work item within this focus activity: template development. Elaboration of the template not only assists the group in its activities but also identifies how the CORBAmed template relates to other OMG activities that relates to extending the OMG object model.

The Enterprise Viewpoint of RM-ODP (Reference Model – Open Distributed Processing) has been proposed as a description technique for specifying the CORBAmed Healthcare System Template (CHST). The Enterprise Viewpoint of the RM-ODP describes the focus, purpose, scope and policies of a system.

However, development of a generalized object-oriented healthcare template is a monumental undertaking for a volunteer group. It is the group's intention to take advantage of technical material included in responses to RFPs to generate this template. The CORBAmed RFP responses would perhaps be required to represent the proposed solutions in other RM-ODP viewpoints, in part utilizing IDL.

Some attempt has been made to position the CHST in relation to the "system views" of the Open Distributed Processing Reference Model (RM-ODP). This document makes no attempt to do this, but once the CORBAmed Roadmap group has reached a suitable conclusion, the results will be recorded in the appropriate document.

6.3 Deliverables

The anticipated deliverable produced by this focus activity is a growing Healthcare Systems Template. Future CORBAmed specifications should include viewpoints which contribute to the description of the semantics behind the interface definitions. These models will provide for increased interoperability and will also ensure consistency with other CORBAmed specifications as they will become part of the CHST.

6.4 Introduction to the CHST

The CORBAmed Roadmap Charter describes the CORBAmed Health Care System Template (CHST) thus,

> "…a template of health care modules and their process interactions. The purpose of the template is to delineate and describe the interfaces and interactions between the various logical modules in health care systems. The interactions and interfaces between the modules will then serve as a reference against which the issuance of future health care related RFIs and RFPs can be considered." (see above for full Charter).

The CORBAmed Health Care System Template *is the property of CORBAmed* and it's contents are determined by the DTF as a whole. The early versions are intended to provide a basis for discussion and as each new version appears it should more fully reflect the views of the DTF. One of the primary influences on the CHST will be the process of developing, issuing and responding to RFPs (Requests for Proposal). As RFPs progress new information and knowledge will emerge that demands changes to the CHST and the Roadmap group will make those changes and issue a new version of the CHST.

This section has two parts: a hierarchy list and Package diagrams. The hierarchy list shows, using indentations, all of the Packages presently completed or under consideration by CORBAmed, and the level that they exist in relation to each other. The diagrams are UML Packages and have keys showing the stage of progress that they are at.

6.5 CORBAmed CHST – Package hierarchy:

CORBAmed Services

Patient Centred Services ++

- Medical Transcription Service <<RFP>>
- Record Locator Service <<future>>
- Person Demographic Service <<future>>
- Person Identification Service (PIDS) <<adopted>>
- Clinical Observations Access Service (COAS) <<RFP>>
- Clinical Image Access Service (CIAS) <<RFP>>
- Summary List Management Service (SLIMS) <<future>>

Provider Centred Services ++

- Careplan Management Service <<future>>
- Careplan Useage Service <<future>>
- Worklist Management Service <<future>>

Enterprise Information Services ++

- Knowledge and Decision Support Services++
  - Lexicon Query Service (LQS) <<adopted>>
  - Protocol Access Service <<future>>
  - Health Data Interpretation Facility (HDIF) <<RFP>>
- Location Service <<future>>
- Resource Management Service <<future>>
- Supplies Service <<future>>
- Organisation Record Service <<future>>
- Authorisation Service <<future>>
- Healthcare Resource Access Control (HRAC)
- Pharmacy Interaction Facility (PIF)

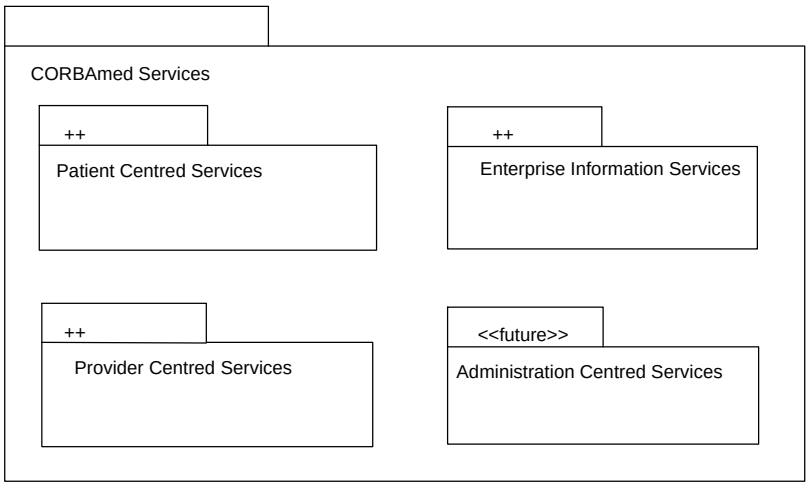
Administration Centred Services <<RFI>>

Key to symbols:

++	*This package is detailed elsewhere*
<<future>>	*Candidate for future adoption processes*
<<RFP>>	*Request for Proposal is current*
<<RFI>>	*Request for Information is current*
<<adopted>>	*This is an adopted OMG specification*

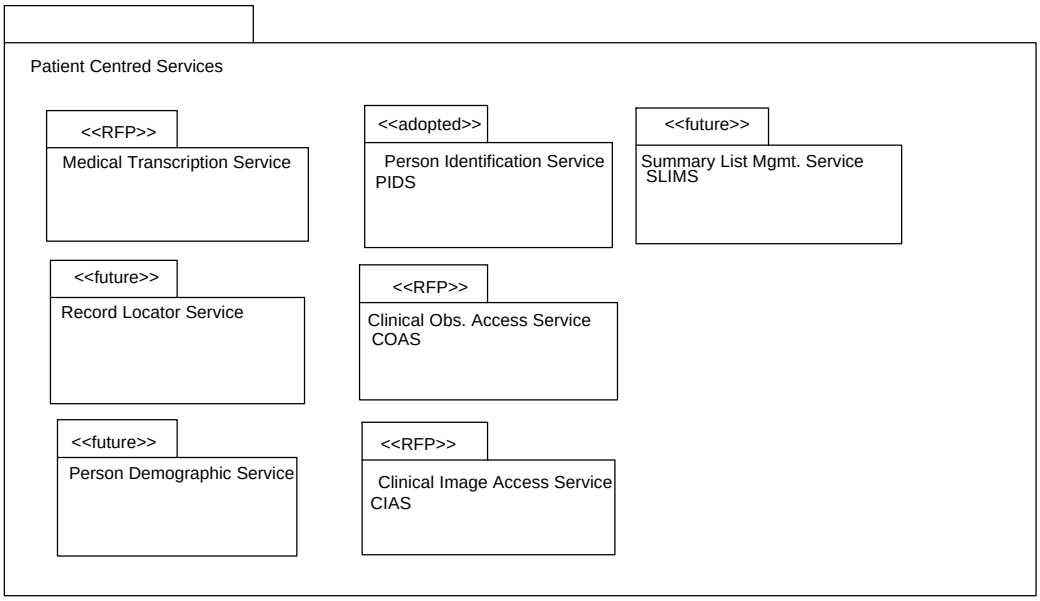
6.6 CORBAmed CHST: Package Diagrams:

6.6.1 CORBAmed Services

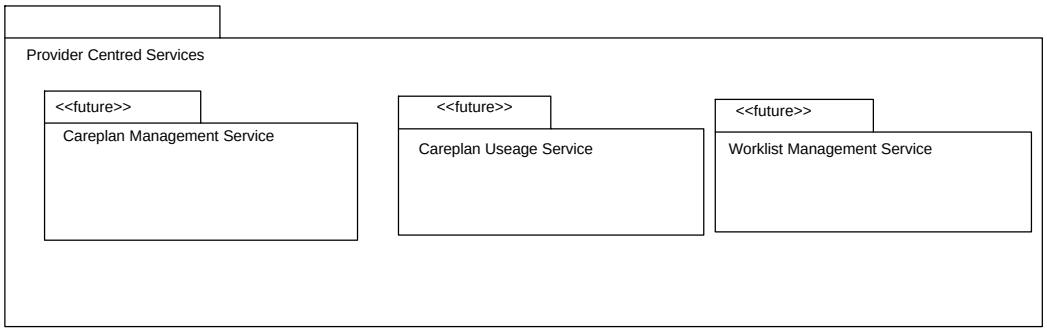


Key to symbols:
++ This package is detailed elsewhere
<<future>> Candidate for future adoption processes
<<RFP>> Request for Proposal is current
<<RFI>> Request for Information is current
<<adopted>>This is an adopted OMG specification

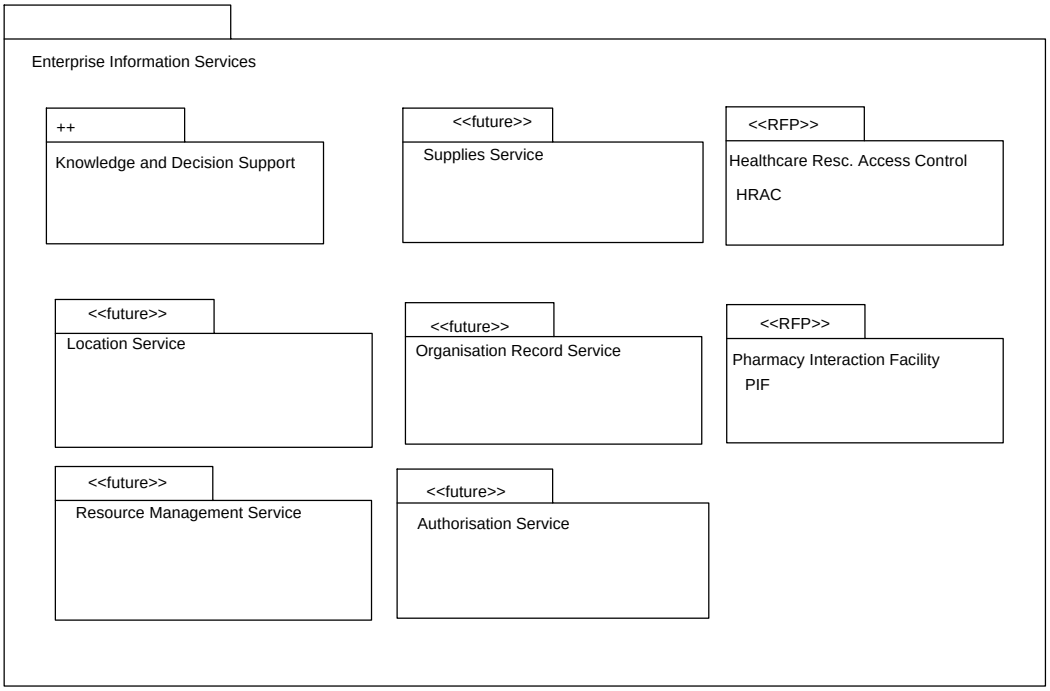
6.6.2 Patient Centred Services



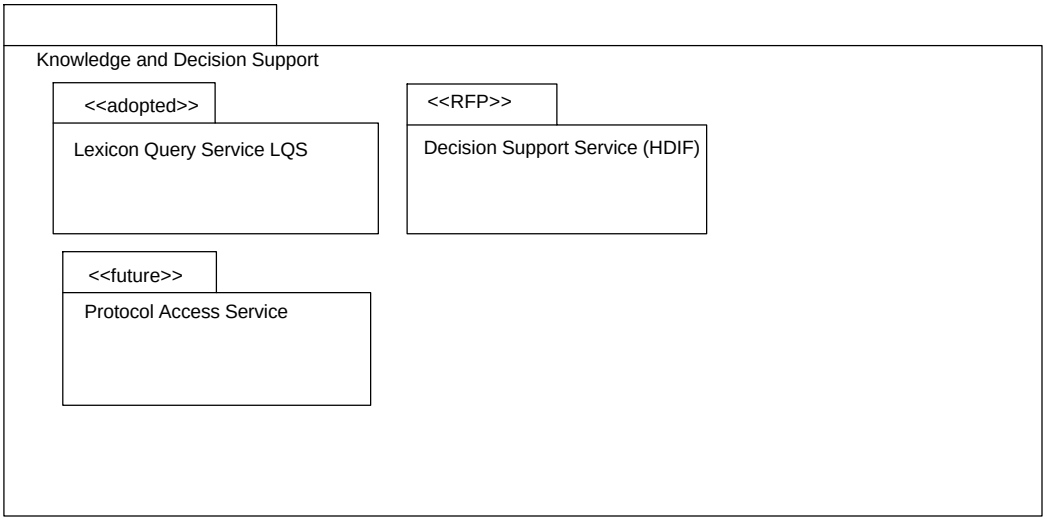
6.6.3 Provider Centred Services



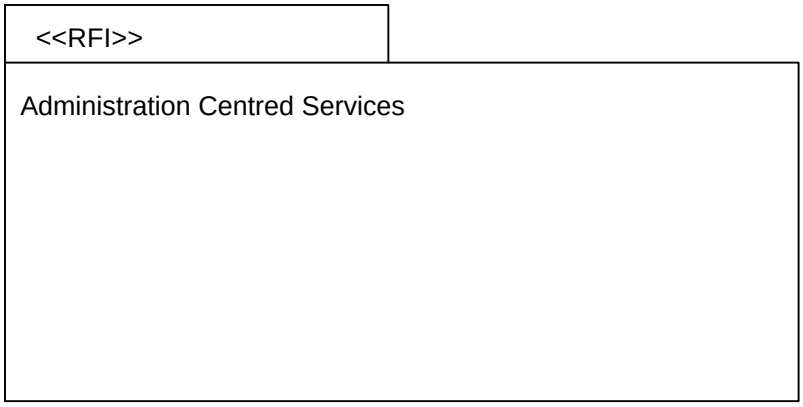
6.6.4 Enterprise Information Services



6.6.4.1 Knowledge and Decision Support



6.6.5 Administration Centred Services



6.7 Package Descriptions (brief)

CORBAmed Services This is a notional package to illustrate the extent of the expected complete scope of CORBAmed's activities.

Patient Centred Services ++ Those services that are chiefly centred around identifying and describing the patient.

Medical Transcription Service <<RFP>>Transcription of clinical information about the patient - to be entered into the patient record.

Record Locator Service <<future>> Enables the location of segments of a distributed patient record.

Person Demographic Service <<future>> Provides demographic information about persons (date of birth, name, address, relationships to other people etc.).

Person Identification Service (PIDS) <<adopted>> Enables matching of person traits and identifiers - a tracing service.

Clinical Observations Access Service (COAS) <<RFP>> Enables access to observations made of an observed subject. These observations of many types (text, measurements, wave forms etc.).

Clinical Image Access Service (CIAS) <<RFP>> Enables access to images made of an observed subject.

Summary List Management Service (SLIMS) <<future>>

Provider Centred Services ++ Services that are chiefly aimed at provider support.

Careplan Management Service <<future>> Creation of a plan of clinical and administrative activities (or events) that may be executed by the care plan execution service.

Careplan Useage Service <<future>> Invokes the establishment, requesting, performance and other states of work items. Manages the on-line co-ordination of activities between peer Care plan execution servers.

Worklist Management Service <<future>> Utilises information about planned activities to develop worklists for specific agents.

Enterprise Information Services ++ Provision of organisational information that can be used in the planning and execution of care.

Knowledge and Decision Support Services++ Generic package, covering LQS, & provide protocol & enterprise info.

Lexicon Query Service (LQS) <<adopted>> Provision of lexical and knowledge information.

Protocol Access Service <<future>> Provide complete or part protocols for implementation as care plans.

Health Data Interpretation Facility (HDIF) <<RFP>> Decision support facility.

Location Service <<future>> Provide information on physical locations: postal addresses, map references, wards etc..

Resource Management Service <<future>> Locate, allocate and

dispose of resources.

Supplies Service <<future>> Locate, allocate and dispose of consumable resources.

Organisation Record Service <<future>> Identify organisations, their nature and roles and their relationships to each other.

Authorisation Service <<future>> Provide information on the authorities, rights and responsibilities of organisations and people. Includes sources of authority.

Healthcare Resource Access Control (HRAC) The CORBAmed security service.

Pharmacy Interaction Facility (PIF) Facilitate the communication of prescription information between pharmacy prescribers and pharmacy dispensers.

Administration Centred Services <<RFI>> Services to the enterprise of an administrative (non clinical) nature.

7 OMG SUPPORT

7.1 Introduction

The purpose of this focus activity is to ensure consistency and support of healthcare domain requirements with existing and future OMG specifications. It will also be a forum for expressing healthcare requirements to existing and future OMG specifications.

7.2 Specific Work Items

General work items within this focus activity identified to date include:

- Identify and evaluate appropriate OMG specifications
- Participation in the Domain Technical Committee (DTC)
- Observation of the OMG Architecture Board (AB) activities
- Participation in Platform Technical Committee (PTC) task forces

Specific work items include:

- Unifying CORBAmed frameworks / interfaces with related OMG activities
- Working with the BODTF to develop a unifying OMG domain model
- Alignment with workflow specifications
- Evaluation of the CORBAsecurity service
- Evaluation of the Notification Service

7.3 Deliverables

Anticipated deliverable produced by this focus activity include:

- Documented conflicts / gaps / overlaps / acceptances
- Revisions to OMG DTC (and possibly PTC) specifications
- Revisions to healthcare domain specifications

8 OMG Policy and Procedure

The OMG Process FAQ – "Facts About Major OMG Technology Processes" can be found at http://www.omg.org/techprocess/faq_process.html.

8.1 Explanation of the OMG RFI Process

Requirements Elaboration activities are achieved primarily through the issuance of Requests for Information (RFIs). The OMG RFI process does not directly lead to technology adoption. RFIs are used by task forces to solicit general information from the industry. Both OMG members and non-members can respond. Submissions may include information about relevant technologies, products, standards, research, requirements, and other guidance for the task force.

RFIs are recommended by CORBAmed to the Architecture Board (AB) and Domain Technical Committee (DTC) for issuance. RFIs are usually created whenever information is needed by the task force or a collaborating group to solicit information about industry requirements. In some cases, CORBAmed will issue an RFI in order to define industry requirements for key OMG technology and to help locate potential technology sources for fast track adoption.

There are no restrictions on who may respond to an RFI. RFI responses are evaluated by members of the CORBAmed and are used to guide the group's activities. Restrictions are placed on the voting process, however. A DTC member must be at least at the Domain Contributing Member (DCM) level in order to vote for issuance of a RFI.

The following timetable shows a typical schedule of events for a CORBAmed RFI. The duration is approximate. An exact schedule (with specific dates) is established for each RFI.

Day	Event / Activity	Duration
	RFI review ("Three week rule")	21 days
	Vote by CORBAmed to issue RFI	
0	Vote by AB and DTC to issue RFI	
	Preparation of submissions	120 days
120	Submissions due	
	Review of RFI responses by CORBAmed	30 days
150	Evaluation report by CORBAmed	

TYPICAL RFI PROCESS TIMETABLE

8.2 Explanation of the OMG RFP Process

The OMG Request for Proposal (RFP) process entails a solicitation for technology proposals, followed by revision, evaluation, selection, and approval processes. CORBAmed evaluates the RFP submissions and revised submissions. CORBAmed then selects specifications (by vote of members who are at least at the Influencing or Government Member level) which it recommends to the DTC and AB. OMG members who are at least at the Domain Contributing Member (DCM) level then vote to recommend adoption. The Architecture Board (AB) review normally precedes the DTC vote. The final step is to forward the proposal to the OMG Board of Directors (BoD) for final approval. Adopted specifications are then available for use by OMG members and non-members alike.

Following the conventions established by the other OMG task forces, CORBAmed will use a three step process for handling submissions. This process can be altered by consensus of CORBAmed.

8.2.1 Submissions

OMG members who are at the least at the DCM level can submit a proposed specification in response to an RFP. Submitters must send a Letter of Intent (LOI) to the OMG declaring their commitment to commercialize the technology. If an organization is not at the DCM level, they may upgrade their membership to either DCM (or Contributing Member) prior to submission. Groups of DCM and/or Platform Contributing Members may submit in teams, representing multi-vendor alliances and external consensus. Other organizations, which are not co-submitters, may be identified in the proposal as supporters of a technology.

The RFP will establish a submission deadline for the full technology specifications.

8.2.2 Revised Submissions

There will be a subsequent deadline for revised submissions. This revision process encourages mergers of submissions. An organization must have submitted an initial submission in order to participate in a revised submission. For revised submissions, a date by which a working implementation will exist is required.

8.2.3 Specification Selection

After revised submissions are received, the CORBAmed will select (through evaluation) a single specification for each RFP item. Specifications may be conditionally accepted subject to minor changes to be made by the submitter. In most cases, the CORBAmed will establish a revision process to improve specifications in terms of clarity or correctness. Major changes to selected specifications will only take place during a later RFP or RFC-driven enhancement cycle.

A specification selected by CORBAmed is then endorsed by the Architecture Board, Domain Technical Committee and Board of Directors.

The CORBAmed RFP process will typically follow the timetable shown below:

Day	Event / Activity	Duration
	RFP Review (“Three week rule”)	21 days
	Vote by CORBAmed to issue RFP	
0	AB and DTC votes to issue RFP	
	Preparation of submissions	120 days
60	LOI to submit to RFP due	
90	Voting registration for CORBAmed members closed	
120	Submissions due	
	Preliminary evaluations by CORBAmed and preparation of revised submissions	120 days
240	Revised submissions due	
	Specification selection by CORBAmed	60 days
300	CORBAmed votes to select specifications	
	Review by AB and DTC (“Three week rule”)	21 days
	AB and DTC votes to recommend specification	
	BoD review	
360	BoD votes on specification adoption	

TYPICAL RFP PROCESS TIMETABLE

Please note that duration noted above is approximate. The exact schedule (with specific dates) for each RFP will be established on an RFP-by-RFP basis and documented in the RFPs.

8.3 Explanation of the OMG RFC Process

The OMG Request for Comment (RFC) process is a fast track adoption process that uses an industry comment period. The RFC process includes the following steps:

The OMG RFC process starts with an unsolicited technology proposal submitted by one or more OMG members who are at least at the Domain Contributing Member (DCM) level to the CORBAmed. If an organization is not at the DCM level, they may upgrade their membership to DCM (or Contributing Member) at any time prior to submission.

A presentation and vote on the RFC can be scheduled for a particular CORBAmed meeting by one of the CORBAmed co-chairs. The technology proposal should be available to CORBAmed members three weeks prior to this meeting. At the meeting, the role of the submitters is to convince the CORBAmed to recommend the proposal for OMG review. A CORBAmed member must be at least at the Influencing or Government Member level in order to vote.

After the CORBAmed recommendation, the Architecture Board and Domain Technical Committee votes to release the RFC, starting the public comment period. DTC members must be at least at the DCM level of membership in order to vote.

The RFC comment period is 90 days. Any OMG member or non-member may comment. OMG staff can stop the RFC process if they determine that significant negative comment has been received.
After the comment period, the AB and DTC vote for technology adoption. A DTC member must be at least at the DCM level in order to vote.
The final step is OMG Board of Directors (BoD) approval.

CORBAmed encourages the use of the RFC process because it consumes fewer resources than a comparable RFP process. CORBAmed offers the following guidance to potential submitters:

The submitters should be confident that the proposal will survive the RFC period without significant comment.

If there is an external industry group that covers the proposal's technology area, it would be highly desirable if the submission represents an industry consensus from the external group.

The submitters should consider soliciting feedback from CORBAmed prior to submission. Most potential submitters give a presentation to CORBAmed and disseminate a pre-submission draft of the specification for review. The early

review can surface potential problem areas. This optional step can greatly enhance the chances of successful technology adoption.

The following timetable shows a typical schedule of events for a CORBAmed RFC process. The duration is approximate. Exact schedules (with specific dates) are established for each RFC.

Day	Event / Activity	Duration
	Formal submission of full specification for review by CORBAmed, AB and DTC ("Three week rule").	21 days
	Vote by CORBAmed to issue RFC for OMG review	
0	Vote by AB and DTC to release RFC for OMG review	
	Review period – comments from industry	90 days
90	CORBAmed votes to recommend specification	
	AB and DTC votes to recommend specification	
	BoD review	30 days
120	BoD votes on specification adoption	

TYPICAL RFC PROCESS TIMETABLE

9 Appendices

9.1 Appendix A: Healthcare DTF Three-Year Plan

This appendix summarises the Healthcare Domain Task Force activity for a three-year period.

1998	1999	2000
First draft of Roadmap	Roadmap version 1.0 release	Roadmap version 2.0
CORBAmed Toolkit 1.0 draft	CORBAmed Toolkit 1.0 release	CORBAmed Toolkit 2.0 release
Person Identification Service (PIDS) Revision Task Force	Person Identification Service Implementations	Complete
Lexicon Query Service (LQS) Revision Task Force	Lexicon Query Service Implementations	Complete
Clinical Observation Access Service (COAS) RFP issued	Clinical Observation Access Service (COAS) Technology Adoption	Clinical Observation Revision Task Force
Healthcare Data Interpretation Facility (HDIF) RFP issued	Healthcare Data Interpretation Facility Technology Adoption	Healthcare Data Interpretation Facility Revision Task Force
Healthcare Resource Access Control (HRAC) RFP issued	Healthcare Resource Access Control (HRAC) Technology Adoption	Healthcare Resource Access Control (HRAC) Revision Task Force
Clinical Image Access Service (CIAS) RFP issued	Clinical Image Access Service (CIAS) Technology Adoption	Clinical Image Access Service (CIAS) Revision Task Force
Medical Transcription Management (MTM) RFP issued	Medical Transcription Management (MTM) Technology Adoption	Medical Transcription Management (MTM) Revision Task Force
CORBA/M Interoperability RFI issued	CORBA/M RFI response review	CORBA/M RFP issued
Healthcare Administrative Logistic Financial and Enterprise Management (HALFEM) RFI issued	Healthcare Administrative Logistic Financial and Enterprise Management (HALFEM) RFI response review	

	Healthcare Administrative Logistic Financial and Enterprise Management series of RFP's issued: Encounter Management RFP Enterprise Management RFP Financial Services including: Enrolment Management Service RFP Eligibility Service (US specific) RFP (?) Charge Capture Management Service RFP Authorization Management Service RFP Referral Management Service RFP Claims Management Service RFP Remittance Management Service RFP	HALFEM Technology Adoptions
	Pharmacy RFI issued and responses evaluated	
	Pharmacy Disease Management Service RFP issued	Pharmacy Disease Management Service RFP Technology Adoption
	Pharmacy Drug Therapy Management Service RFP issued	Pharmacy Drug Therapy Management Service RFP Technology Adoption
	Summary List Information Management Service (SLiMS) RFP issued	Summary List Information Management Service (SLiMS) Technology Adoption
	Order Management Service RFP issued	Order Management Service Technology Adoption
	Card Management Service RFP issued	Card Management Service Technology Adoption

	Record Locator Service RFP issued	Record Locator Service RFP Technology Adoption
		Credential Verification Authority Management Service RFP issued
		Laboratory Information Access Service RFP issued
		Medical Device Information Access Service RFP issued
		Point of Care Information Access Service RFP issued
		Authoring Management Service (XML) RFP issued
		Other RFI and RFP issuance as the requirement of the industry dictate. Decision Support and Security workgroups continually formulate requirements for the issuance of further RFP and Technology Adoption.

Table: CORBAmed Three-Year Plan

9.2 Appendix B: Acronyms and Abbreviations

AB	Architecture Board
BoD	Board of Directors
BODTF	Business Object Domain Task Force
DCM	Domain Contributing Member
DTC	Domain Technical Committee
DTF	Domain Task Force
IDL	Interface Definition Language
ISO	International Organization for Standardization
LOI	Letter of Intent
PTC	Platform Technical Committee
RFC	Request for Comment
RFI	Request for Information
RFP	Request for Proposal
SIG	Special Interest Group

9.3 Appendix C: References

[ISO 94] International Organization for Standardization. ISO 10301-11:1994.

[ISO 96] International Organization for Standardization. *"Interface Definition Language (IDL) Binding to the Standard Data Access Interface (SDAI) Specification".* ISO 10303-26. 1996.

[OMG 94] Object Management Group. *Policies and Procedures of the OMG Technical Committee,* Document Number 1994/94-04-14. Framingham, MA: Object Management Group, 1994.

[OMG 95] Object Management Group. *Object Management Architecture Guide, Version 3.0.* Framingham, MA: Object Management Group, 1995.

[OMG CF 95] Object Management Group. *Common Facilities Roadmap, Revision 3.2.* Document Number 1995/95-01-32. Framingham, MA: Object Management Group, 1995.

9.4 Appendix D: Contacts

RFI1 – CORBAmed RFI
??
RFI2 - Clinical Observation Access Service (COAS)
Tim Brinson - Protocol Systems - tim@protocol.com
RFI3 - Clinical Decision Support
Dave Kilman – Theragraphics - dave@theragraphics.com
RFI4a Health Level 7 (HL7)
??
RFI4b Lifesciences
??
RFI5 – CORBA/Mumps Interoperability (CORBA/M)
??
RFI7 – Healthcare, Administrative, Logistical, and Financial Encounter Management (HALFEM)
Eric Butler - BHS - Ericb@baptisthealth.net

RFP1 – Patient Identification Service (PIDS)
Tom Culpepper - 3M - tcculpepper@wpmail.code3.com
RFP2 – Lexicon Query Service (LQS)
Tom Culpepper - 3M - tcculpepper@wpmail.code3.com
RFP3 – Pharmacy Interaction Facility
Erick Hagstrom – Envoy - mailto:Erick.Hagstrom@envoy.com
RFP4 – Clinical Observation Access Service (COAS)
Tom Culpepper - 3M - tcculpepper@wpmail.code3.com
RFP5 – Healthcare Resource Access Control (HRAC)
Konstantin Beznosov - BHS - beznosov@baptisthealth.net
RFP6 – Healthcare Data Interpretation Facility (HDIF)
Dave Kilman - Theragrapics - dave@theragraphics.com
RFP7 – Clinical Image Access Service (CIAS)
Yassar alSafadi - Philips Research - yha@philabs.research.philips.com

9.5 Appendix E: CORBAmed Mission and Goals

CORBAmed is the Healthcare Domain Task Force of the OMG, the Object Management Group, a non-profit international organization based near Boston, and indented to the promotion of Object Oriented methodologies. The main product of the OMG is the CORBA standard, "Common Request Broker Architecture." The CORBA architecture has a broad range of applications in many application domains. Task Forces deal with the specific aspect of various application domains, who have common interest in the the same interface technologies. Task Forces are specialized in various domains as Electronic Commerce, Manufacturing, etc... and CORBAmed in health care applications.

CORBAmed defines standardized interfaces to many healthcare "Object Oriented Services," across most usual platforms, and available in the public domain. CORBAmed is important for health care organizations and end users, because it provides compatibility to a much wider range of software components. It is important for software providers because it provide access to a much larger market for specialized services.

Mission

- To improve the quality of care and reduce costs by use of CORBA technologies for interoperability throughout the global healthcare community
- To utilize the OMG technology adoption process to standardize interfaces for healthcare objects
- To communicate the requirements of the healthcare industry to the Platform Technical Committee
- To assist and advise the Liaison Subcommittee regarding the relationship with healthcare standards organizations and consortia.

Goals

- To educate both the system developers and the user community in the health care industry
- To issue RFIs and RFPs related to the healthcare industry based on CORBA technologies
- To evaluate RFI and RFP responses and RFCs for recommended adoption by the Domain Technical Committee.

The CORBAmed Task Force

The Healthcare systems of the developed world are at a critical point. Dramatic changes in the way healthcare agencies and medical professionals work together are

required to retain positive cash flows while maintaining high standards of patient care. The problems and concerns of every healthcare organization are well known:

> **Competitive Pricing** has become a pressing reality with new business practices being instituted by insurance companies and reductions in government insurance programs.
>
> **Ubiquitous Lifetime Records** are required now that patients obtain services from many different locations within any given healthcare organization.
>
> **Lack of Computing Interoperability** presents serious issues for hospitals using varied devices, instruments and systems that collect and maintain patient information.

Times and technologies have changed and the successful healthcare organization will be the one that can address these issues while also keeping in mind the need for patient record confidentiality. And the Object Management Group, in conjunction with concerned technologists in the Healthcare industry, has forged an alliance to address these very issues. With the formation of OMG's CORBAmed Task Force, the computer industry has taken a stand. The CORBAmed objective is to improve Healthcare delivery by:

- Promoting interoperability among healthcare devices, instruments and information systems using CORBA technology.
- Expanding the awareness and use of CORBA technologies by healthcare organizations to ensure industry interoperability.
- Improving the quality of care and reducing costs through the use of CORBA
- Supporting the reliable and secure sharing of medical information among healthcare organizations.
- Using the OMG technology adoption process to standardize interfaces for healthcare objects.
- Working with international standards organizations to develop and promote interoperability in the healthcare industry.

You are invited to join this dedicated group in their mission to solve the critical problems facing Healthcare IT professionals. Meetings are being held to discuss a range of topics in an open and productive forum.Find out how you can help drive the changes that will allow your organization to stay competitive in an increasingly complex market. You'll learn how OMG's CORBA specification can help solve the problems of interoperability and security.

OMG and CORBAmed invite you to join them in their mission of bringing true interoperability to the healthcare industry. CORBAmed meets in conjunction with scheduled OMG Technical Committee meetings.

9.6 Appendix F – OMG Background

The Object Management Group (OMG) was founded in May 1989 by eight companies: 3Com Corporation, American Airlines, Canon, Inc., Data General, Hewlett-Packard, Philips Telecommunications N.V., Sun Microsystems and Unisys Corporation. In October 1989, OMG began independent operations as a non-profit corporation. Through the OMG's commitment to developing technically excellent, commercially viable and vendor independent specifications for the software industry, the consortium now includes over 800 members. As OMG moves forward in establishing CORBA as the "Middleware that's Everywhere" through its worldwide standard specifications: CORBA/IIOP, Object Services, Internet Facilities and Domain Interface specifications. OMG is headquartered in Framingham, Massachusetts, USA, with international marketing partners in the UK, Germany, Japan, India and Australia.

OMG was formed to create a component-based software marketplace by hastening the introduction of standardized object software. The organization's charter includes the establishment of industry guidelines and detailed object management specifications to provide a common framework for application development. Conformance to these specifications will make it possible to develop a heterogeneous computing environment across all major hardware platforms and operating systems. Implementations of OMG specifications can be found on over 50 operating systems across the world today. OMG's series of specifications detail the necessary standard interfaces for Distributed Object Computing. Its widely popular Internet protocol IIOP (Internet Inter-ORB Protocol) is being used as the infrastructure for technology companies like Netscape, Oracle, Sun, IBM and hundreds of others. These specifications are used worldwide to develop and deploy distributed applications for Manufacturing, Finance, Telecoms, Electronic Commerce, Realtime systems and Health Care.

OMG defines object management as software development that models the real world through representation of "objects." These objects are the encapsulation of the attributes, relationships and methods of software identifiable program components. A key benefit of an object-oriented system is its ability to expand in functionality by extending existing components and adding new objects to the system. Object management results in faster application development, easier maintenance, enormous scalability and reusable software.

The acceptance and use of object-oriented software is widespread and growing. Virtually every major provider and user of computer systems in the world is either using or planning to implement object-oriented tools and applications. Within the next three to five years, revenue from the sale of object-oriented software is projected to exceed three billion dollars.

Find out more via http://www.omg.org.